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Portable Steam Engine.

The many uses in which portable steam engines can be employed at the present day is only limited by the capability and capacity of the engine itself. It is within the memory of every reader almost, that steam first began to be employed as a power in place of man and horse-power in the numerous avocations where small power was required temporarily, such as threshing grain, sawing wood, driving piles, raising building materials, pumping, boring wells, etc. It is not uninteresting, either, to observe the changes that have been made in this kind of engine since its first advent. From a heavy, cumbrous, and ill-appearing apparatus, which used fuel at a fearful rate, with a minimum of power, we come to the present neat, light, portable and economical affair, which seems endowed with intelligence, almost, so perfect and complete is its operation.

The accompanying illustration shows the Wood & Mann portable engine, which is somewhat peculiar.

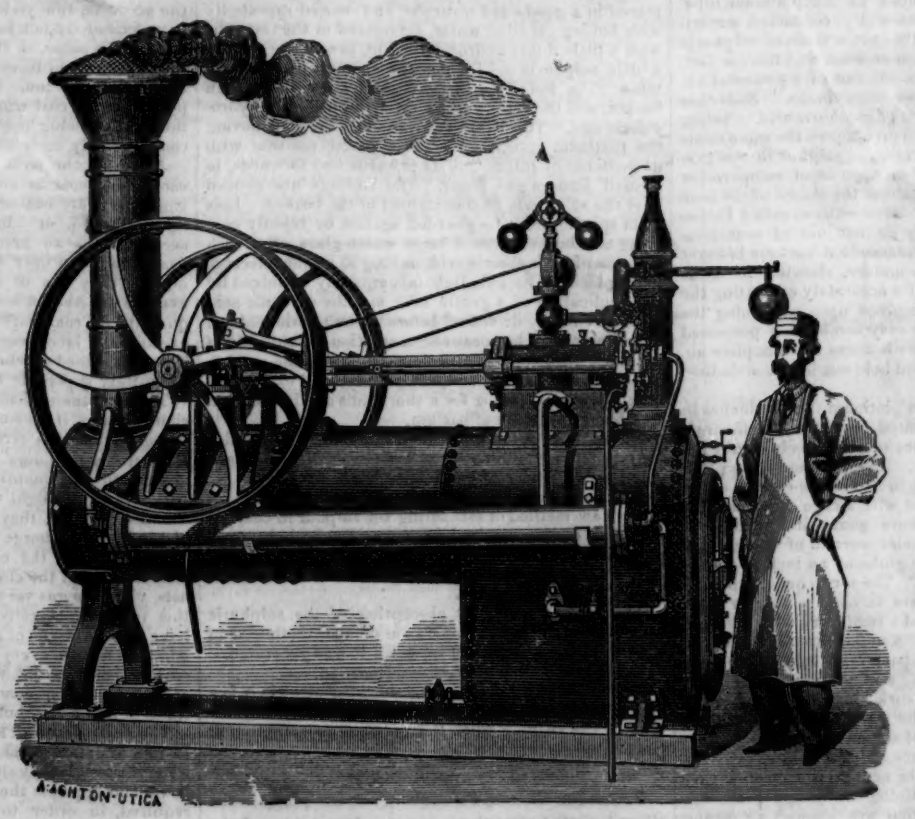
As will be readily seen it is a horizontal tubular boiler, with the engine placed on its top. By this arrangement all contraction and expansion that can cause injury is avoided. It will be observed the fly-wheel and band wheel are on opposite sides of the boiler, which prevents oscillation or lateral stress of the boiler.

The guides for cross-heads and main journals, from the peculiar construction of their stands, will always keep cool, a serious difficulty with many other engines. This engine has for a heater a large pipe placed at the side of the boiler, as shown. The water from the pump is forced into the end of this, and is carried to the back end into a chamber by an inside tube; from this chamber another pipe is taken, returning to the front end: the water then passes through a check-valve into the boiler. The exhaust pipe from the cylinder is connected to the heater, and the exhaust steam fills the heater surrounding the pipe, through which the water passes from the pump, heating the water as it passes through them to nearly the boiling point—all this is so much gain, as the heat is obtained from the exhaust after it has done its work. After heating the water the exhaust steam passes off into the spark-pipe killing the sparks and creating a draft.

It is asserted this heater causes a great saving of fuel, which will be readily admitted by the expert.

Another feature in this engine is the newly invented *water bottom*, which entirely surrounds the fire grate and ash-pit, as up the sides of the furnace is a three or four inch water space, by which additional surface is obtained—preventing the accumulation of sediment around the fire-box, and rendering it safe from accident by fire in any location near buildings, etc. The sediment is removed by a blow-off cock underneath the ash-pit, which keeps the boilers much more free than by the old system.

These engines are complete in all their appointments



PORTABLE STEAM ENGINE.

of superior workmanship, are simple in design, combining compactness and strength, and are strictly portable, comprising everything requisite for a complete and durable engine.

For further information apply to the Wood & Mann Steam Engine Co.'s Works, Utica, N. Y. Offices and warerooms 89 Liberty street, N. Y. City, and 201 and 205 South Water street, Chicago, Ill.

Light from Atmospheric Oxidation.—H. Baumhauer says that oxidation is so rapid upon a perfectly clean surface of potassium or sodium, that light is thereby evolved.

Sewage in Paris.

The sewage question is one which has lately attracted considerable attention in Paris; the problem, of course, has been to remove the sewage from the town in the most advantageous manner. The volume of these waters is now 100,000 cubic metres a day, soon it will be double this amount, and in a few years probably 500,000 to 600,000 cubic metres. We have three solutions of the difficulty. The first and most obvious is to carry the sewage into the Seine; this scheme has been well tested already, and the disadvantages seem more striking than the advantages. The advocates of a second plan would employ the sewage, which they would first raise by machinery to a considerable hight, in the irrigation of the fields. The fertilization of the sands at the mouth of the Thames by this means is cited in favor of the plan. The third scheme recommends itself as being the most scientific, and it is, perhaps, the best; experiments have been made with this scheme since the commencement of the spring. The sewage waters, collected in large basins, are mixed with a certain amount of sulphate of alumina—about one per cent. to the cubic metre. Organic matters contained are rapidly precipitated, each cubic metre yielding about 2 klgrms of solid manure. The decanted fluid, termed clear water, can be employed in the irrigation of soils, upon which it has a very fertilizing action; it contains, in fact, small quantities of mineral matters in suspension, a little nitrogenous and organic matter, and the whole of the alkaline salts. The deposit obtained in the clarification is abundant and compact; it contains the whole of the phosphoric acid and nine-tenths of the nitrogenous and organic matter, and the mineral matters dissolved or in suspension; it constitutes an excellent manure, very fertilizing, and easily transportable. Towns would thus be considered at manure factories, and it is believed that the value of the manure may be made to defray the expense of supplying the own with pure water.

—Paraffine, it has been discovered, is an excellent preservative of fresco walls which are beginning to crumble with age.

Estimation of Sulphur in Coal Gas.

BY WM. VALENTIN, ESQ.,
Principal Assistant in the Royal College of Chemistry.

In an article "On a New Method for Estimating Sulphur in Coal Gas," published in the *Journal of Gas Lighting* of January 7, 1868, I drew the attention of gas engineers to the defects of the method now generally in use for estimating the sulphur in gas. I stated that at some future time I would submit the two methods—viz., that described by me, which, for shortness sake, I will call the *platinum process*, and the *lime* (soda-lime) *process*, to some further comparative experiments.

Since writing these lines I have had occasion to make a series of experiments on the estimation of sulphur, both in the form of volatile sulphur compounds and that of sulphates contained in grains, such as wheat, peas, beans, etc., and have for this purpose combined the two methods of combustion—viz., over spongy platinum and over pure soda-lime perfectly free from sulphuric acid. To effect this I employed a tube made of thin platinum, in which the combustion of the volatile sulphur compounds was accomplished by passing them over spongy platinum, and then over a layer of soda-lime. The air which was required to burn the volatile organic matter was supplied through a narrow platinum tube, which branched off from the main tube a little way anterior to where the layer of spongy platinum was placed. An aspirator drew the required amount of air through the tube, and by means of an adapter-tube and flask containing some solution of *pure* caustic soda, any sulphuric acid could be arrested that might possibly escape the absorptive and fixing action of the caustic alkalies placed in the platinum tube. After a number of most carefully conducted experiments, I satisfied myself that not a trace of sulphuric acid escaped from the platinum tube, and that, in fact, my precaution of having a solution of a powerful absorbing agent in front was superfluous. *Soda-lime absorbs and arrests every trace of sulphuric acid.* Acting upon this observation, I at once adopted the same mode of proceeding for the estimation of sulphur in coal gas. Thus, instead of carrying on a series of comparative experiments in order to establish the claims of the lime process over the platinum process—the so called Letheby process, I believe, may be left out of consideration altogether, after the evidence that has been brought forward by various investigators, showing its utter worthlessness as a process for accurately estimating the sulphur in coal gas—I resolved upon combining the advantages of perfect and easy combustion possessed by the platinum process with those for complete absorption of the sulphuric acid held out by the soda-lime process.

To this end I employed a platinum tube 13 inches in length, which could be heated on a small Hoffmann's combustion furnace, in place of the porcelain tube described in a former article. The portion of the platinum tube, 5 inches in length and three-eighths of an inch in diameter, is charged with a cage constructed of a double roll of fine platinum gauze and filled with spongy platinum. The wider portion of the tube, 4 inches in length and five-eighths of an inch in diameter, contains the soda lime. The air requisite to completely burn the gas enters through a narrow glass tube, connected by means of a small cork with the wide end of the platinum tube. A cap of an alloy of silver and copper soldered to this part of the tube strengthens it sufficiently to prevent the thin platinum from being injured by a tightly fitting cork. The supply of gas to the tube passes through the narrow tube four inches long and three-sixteenths of an inch in diameter, likewise capped, which branches off at a right angle from the portion of the main tube next to the anterior part of the platinum cage containing the spongy platinum. The products of combustion are allowed to escape through the narrow platinum tube. Connections for supplying gas and air are made by narrow non-vulcanized black india-rubber tubing.

I find it most convenient to supply the air under slight pressure by means of a gasholder, from which the air is expelled by displacement with water. Such gasholders are found in most gas-works. A Low's motive-power meter may also be employed with great advantage, as it is capable of being regulated so as to give a supply of air sufficient for one experiment, whilst a small gasholder would require to be refilled with air once or twice during an experiment. The pressure from the gas-mains is at all times sufficient to send the gas through the platinum tube. The respective proportions of gas and air are best regulated by means of meters, when the pressure-gauge must of course show the same heights of water column, or the air may also be adjusted without having to pass through a meter merely by using a compression-cock on the narrow india-rubber tube, as described in a former paper.

Preparatory to an experiment the platinum tube is charged with pure soda-lime, by dropping in a lump sufficiently large to easily block up the narrow exit-tube. The whole of the wide portion of the tube is then gradually filled with loose pieces of soda-lime, of a size to enable the operator speedily to shake out the charge of soda-lime when the combustion is over. By gently tapping the platinum tube, held in an upright position whilst it is charged, the layer of soda lime shakes down pretty completely, and is yet sufficiently porous to allow of a free and easy passage for the gaseous products of the combustion. The cage of spongy platinum is next introduced, and pushed down past the narrow branch tube. The gas and air connections are then made, and the platinum tube is placed upon a small combustion furnace, and heat applied to it by turning on the required number of gas burners at once. The platinum tube is best protected from the action of the gas flames by being kept imbedded in asbestos loosely spread in a thin layer along a trough made of tinned sheet iron. The supply of gas to the clay gas burners should at no time be so great as to cause flames to shoot up above the burners or the tiles which cover the furnace. A dull red heat is sufficient, especially as much heat is generated inside the platinum tube by the combustion of the gas and air within the pores of the spongy platinum.

From 5 to 1 cubic foot of gas can conveniently be burned per hour, requiring from 5 to 10 cubic feet of air for its complete combustion. An experiment can thus be done in three to four hours, since as a rule 2 to 4 cubic feet of gas burned in the manner described yield sufficient sulphuric acid for an accurate weighing in the form of sulphate of barium.

The experiment over, the tube is allowed to cool in a slow current of air alone. The two ends are disconnected, and the cage of spongy platinum drawn out by means of a copper wire having a little hook at one end. A stout bit of platinum wire in the form of a loop or ring may also be attached to the cage, for the more ready removal of the platinum cage. The latter is placed in a good-sized test-tube, and treated repeatedly with boiling distilled water, acidulated in the test tube with a little dilute hydrochloric acid, in order to remove a little sulphuric acid which the spongy platinum retains. The soda-lime is next shaken out into a high beaker, and the tube washed out with hot dilute hydrochloric acid. This is most conveniently done by moving the platinum tube, held in a horizontal position, with its contents of dilute acid backwards and forwards, in a small Bunsen gas flame. The rinsings are poured over the solid soda-lime contained in the beaker. Loss from spirting must be guarded against by rapidly covering the beaker with a large watch-glass after each addition of hydrochoric acid, as long as an effervescence takes place. The soda-lime is completely dissolved by the application of a gentle heat, and the carbonic acid must be entirely driven off before the sulphuric acid can be precipitated by means of a solution of chloride of barium. On gently heating for some time, the precipitate falls out readily and completely, and may be filtered off after standing for a short time and ignited and weighed as sulphate of barium.

I need not explain that the sulphuric acid can also be estimated volumetrically by means of a standard solution of chloride of barium.

In conclusion, I will shortly point out the advantages of the new method of estimating the sulphur in coal gas over that now in use, and known as Dr. Letheby's sulphur test, viz.:

1. *Perfect* combustion of the gas in a *close* vessel, at a very high temperature.
2. Complete and easy absorption of the sulphuric acid generated by the oxidation of the bisulphide of carbon, in the *same* vessel in which it was generated.
3. No loss from imperfect condensation.
4. Possibility of completing an experiment in a few hours' time, or, as seems most desirable, during the time of the evening when the greatest consumption of gas occurs.—*Journal of Gas Lighting.*

PETROLEUM CENTRE, PA.—There are few places in the oil region that give the stranger a better idea of the manner and magnitude of oil operations—production, and buying and selling—than Petroleum Centre. The celebrated Benninghoff Hill, which no man regarded, a few years ago, as oil territory, is now covered with derricks as far as the eye can reach. The manner of operating for oil can there be seen in all its stages, from the first work of boring to the full performance of the flowing and pumping well. A few years ago the Centre was a wilderness, with no apparent value, and no inducements for the settler. To-day it is a swarming, busy mart, with bank, stores, hotels, and all the incidents of a thriving town. Then it was almost inaccessible; now it is reached by rail in a few hours from the older and more pretentious towns in its neighborhood, and while oil holds out to burn it will be what its name indicates—the centre of the petroleum business of Oil Creek.

Effects of Various Temperatures in Carbonising.

[From Hughes Treatise on Gas Works.]

Coal when submitted to a temperature approaching to 600 deg. Fahr.—that is a very dull red heat as seen in the dark, a degree of heat which slowly chars paper, but does not inflame it—its volatile matter is resolved into tar and oil, and little or no gas is evolved.

Mr. Young, of Bathgate, turned the knowledge of this simple fact to very great advantage, by decomposing Boghead cannel coal at that degree of temperature whereby oil and tar only are obtained, which are afterwards purified, and universally known as paraffin oil. When the operation is properly conducted, the quantity evolved is very small, in some cases perhaps not exceeding 50 feet of 100 feet per ton, the rest of the volatile constituents being condensed into liquid.

In the carbonisation of coal, in proportion as the heat of the retorts increases, so is the quantity of gas augmented, and the tar diminished. The best temperature for iron retorts compatible with their durability and good yield of gas, ranges from 1650 deg. to 1800 deg. Fahr., being cherry-red and bright cherry red; but with clay retorts, a temperature between dull and bright orange, or 2100 deg. Fahr. is the most suitable, giving vastly superior results in the production of gas than can ever be attained by the use of iron retorts.

Iron retorts, when worked at a low temperature, are of very considerable durability; in this state no deposit or incrustation takes place in them; but these supposed advantages are often very dearly purchased. The attention of the writer was once called by a gas manager to the great durability of his iron retorts, which had been in use upwards of fifteen months, had never required clearing of carbonaceous deposit, and were almost in as good condition as when first fixed. This was all substantially correct; but on referring to the accounts, the yield of gas was ascertained not to have exceeded 6,500 feet per ton; whereas by an alteration of furnaces, so that the proper temperature for the retorts could be attained, the yield was afterwards 9,200 feet per ton. By the low temperature a large portion of the coal was converted into tar, and this in the locality being nearly valueless, the enormous loss can be readily understood.

As stated, the most advantageous degree of heat for carbonising coal is about 2100 deg. Fahr.; but when iron retorts are heated above 1800 deg. they are speedily destroyed, or "burnt out." Clay retorts on this account have an immense superiority; they can be heated to the proper temperature without the risk of injury; they are of extraordinary durability (their average duration in some works being four years); the quantity of coal carbonised by them is considerably greater, and labor less than when iron retorts are used. These combined circumstances have caused clay retorts to entirely supersede those of iron.

The time the coal remains in the retort is called the charge; thus, if subjected to four hours' distillation or carbonisation, it is termed a four hours' charge; if for six hours, a six hours' charge. The word charge also applies to the quantity, as when a retort is supplied with a certain weight of coal, say 140 lbs. or 2 cwt. as the case may be; they are respectively called a charge of 140 lbs. or a charge of 2 cwt.

The nature of the coal must regulate the quantity and duration of the charge. Some descriptions, as cannels, yield the gas very rapidly; so in Scotland, where this is very generally used, it is found necessary to have small charges of about 1½ cwt. per retort, or less, which is drawn every three hours. With Newcastle coal, which does not yield its gas so readily, 2½ cwt. are very common charges, which is worked off sometimes in five hours, but more generally in six hours.

The coals destined for carbonisation should always be in a dry state; and when by accident they are otherwise, if possible they should be placed along the retort-house and opposite the beds in use, some hours before required, in order to dry them. In addition to the evils of wet coals already enumerated, according to the opinion of Mr Lewis Thompson, the steam is converted into hydrogen, thus impoverishing the gas; but however correct this may appear in theory, from my own observation it does not occur in practice, the heat to which the steam is exposed being insufficient for its decomposition.

—A new kind of artificial stone has been invented by M. Sorel. It is prepared by combining a saturated solution of chloride of magnesium with calcined magnesia. Billiard balls and ornamental objects are made with this, and a thinner paste of the same material serves to consolidate twenty times its weight of sand and similar material for the formation of tiles and flags or other rougher articles.

The "Pictured Rocks" of El Dorado County, California.

In our issue of 16th May, we published an article headed "A Wonder of Nature" giving a description of the so-called Photographic Landscape Rocks of El Dorado, California, and referring to the unknown cause of the phenomenon.

Mr. J. S. Phillips, Mining Engineer, of San Francisco, has forwarded to us for publication a letter written by him, and which appeared in the *Mining and Scientific Press* of that city, which resolved the mystery, and obtained him some complimentary notices from the scientific public. The letter illustrates the plain fact of chrystallography as there exposed and now recognized in San Francisco.

WADSWORTH HOUSE, SAN FRANCISCO, March 4, 1868.

EDITORS MINING AND SCIENTIFIC PRESS: Having observed the comments of your correspondents, and your editorial remarks, in reference to the extraordinary landscape stones that are being exhibited at the corner of Montgomery and California streets, I have also examined them, and beg space in your next issue for the exposition of the following opinions relating thereto:

A first sight impresses the mind that these views are perfect products of vegetable growth, which by the decomposition of its elements, had been most indelibly marked, by the equivalent *carbon*, for all time; but such is not corroborated by microscope or analysis—as I find the former does not expose its vegetal structure, but *crystallization*; and the latter instead of *carbon, peroxide of manganese*, of the variety called "wad," or "bog manganese," which also contains small quantities of other minerals, in constitutional and mechanical forms. It is found deposited in low lands, from decomposition and disintegration of other minerals, more particularly iron, thereby releasing manganese for new affinities. Now, supposing the sand or debris herein, called tripoli, to have been washed or blown to its bed, it would (like all other muds or sands) be distributed unequally, by the irregular action of the water and wind, and the other distorting forces of subsequent periods, as exemplified throughout the world's geological field, on all scales, from mountain ranges to the miniature hills and dales of these sections, some of which are cut at oblique angles.

We will now infer that the next wash brought manganese (or deposited mineral sand that by decomposition released manganese), which in its turn, united with oxygen, and cradled in its sand support, aggregated in "*radiated groups of acicular* crystals" or in "*fibrous botryoidal* masses," that would create "*dendritic* (tree-like) *delineations*," which literally and most peculiarly characterize the forms of crystalization of this mineral, and therefore portray and explain the arborescent contour of these formations.

The repetition of this process at different times would form the several stratumnal views, as similarly deposited in all aluvial strata.

This may have been further diversified by the presence of magnetic sand, the tremulous motions of a volcanic region, and by the grains being somewhat soluble, coloring and blending in the margins of crystallization, whilst oxide of iron and carbonate of manganese have tinted the foregrounds.

The comparatively regular distances between the (apparent) trees, may be accounted for by the fact of a single interstice between three and four grains of sand, being insufficient in area for the moving power of crystallization to penetrate; and, consequently, several grains must be packed laterally to make room for extending developments, by the greater closing of several spaces, to increase the one wherein the mineral is deposited. J. S. PHILLIPS, M. E.

The Modes of Testing Mineral Oils Used in Lamps.

At a meeting of the London Chemical Society, held June 4th, Dr. B. H. Paul gave an account of "The Modes of Testing Mineral Oil Used in Lamps," in which he showed that the results obtained as indicating the degree of inflammability of this oil were subject to considerable variation, according to the mode in which the test was applied. It was also shown that there was a difference of opinion as to what should be regarded as the firing point, whether it was to be the temporary firing of the first small portion of oil vapor given off or the permanent firing of the oil itself. Between these two results there might be a difference of from ten to twenty degrees Fahrenheit, according as the oil was tested in a shallow open basin, or a partially closed vessel. In reference to the influence of the degree of inflammability of mineral lamp oil on the possibility of accidents occurring in the use of the material, it was shown that the mere volatility of the oil was not the only point to be considered, and that, apart from misuse and carelessness, the construction of the lamps in which it was burnt was of considerable importance. To illustrate this, a lamp filled with what is commonly known as spirit or naphtha (the most volatile portion of petroleum or paraffin oil), was kept burning during the meeting. This lamp was so constructed that there was no communication between the flame and the oil reservoir, except through the tube containing the wick, and consequently there was no chance of oil vapor or an explosive mixture of it with air coming in contact with the flame, so as to cause accident. Other kinds of lamps in which there is free communication between the oil reservoir and the flame, afford less security, especially when the oil used in them vaporises at a low temperature.

The mode of testing oil, and the possible variation of the results obtained under different conditions were illustrated by experiments; and an apparatus devised by Mr. Rippingille, of the Albion Lamp Company, was shown. It consisted of a small copper vessel like a paraffin oil lamp fitted with a thermometer, and a valve and two wires, by which an electric spark could be produced inside the vessel. By gradually heating the oil to be tested in this vessel, and passing the spark from time to time while the temperature was observed, a point was at length reached when there was a slight explosion, and this was taken as the firing point of the oil.

In conclusion, the author pointed out that whatever degree of inflammability was fixed upon as the proper minimum for safety, the mode of testing should be precisely defined, and the experiment should always be made under like conditions.

A short discussion followed, in which Mr. Dugald Campbell, E. T. Chapman, and Dr. Attfield took part. The general conclusion arrived at was that the danger from explosion had been greatly exaggerated, and that when such events occurred they might sometimes be traced to faults of construction in the lamp. It was generally agreed that an oil which does not give off inflammable vapor below 100 deg. Fahr., should be accounted safe, but no precise figure below this point on the thermometric scale was adopted at the meeting, although Mr. Dugald Campbell, amongst other speakers, pressed for a decision to support his own judgment in the matter.

The president, in moving a vote of thanks to Dr. Paul, took occasion to support his view of the case, namely, that the construction of the lamp was as important as the firing point of the petroleum, and that the dangers of explosion had been greatly overrated.

Self-Registering Barometer.

M. Brequet, the well known clock and scientific instrument maker, has exhibited at the Champ de Mars, Paris, a new self-registering barometer, called the "Barometrograph," giving indications every six hours, by diagram, of the pressure of the atmosphere. It consists of four metallic boxes, the upper and lower of which are undulated (the usual aneroid barometer); a vacuum is made in each of these boxes separately, and they are attached to a chain, the movement of which is four times greater than that of a single box for the same variation of pressure. A steel spring acts upon these boxes in a contrary direction to the atmospheric pressure, and communicates with an indicating lever. The registration is effected on a cylinder which revolves by means of an ordinary clock; it makes a complete revolution in a week, and carries a glazed paper, which is covered with lamp black by being held over the flame of a candle; the extremity of this lever, very fine and pointed, traces a line of variations in a white streak. The periods (four times a day) are represented on the diagram by vertical lines, and the barometric readings by horizontal lines placed a millimeter apart, the arm of the indicator being so arranged as to mark the variations on the same scale as a common mercurial barometer. This instrument has none of the errors of the common aneroid barometer resulting from the great number of pieces levers, articulations, gearing, connecting chains, and springs.

SMOKE.—A great deal has been said about the various plans for preventing smoke, and avoiding the waste of fuel consequent upon it. A writer in the London *Mining Journal* recommends *silver* as a preventive. He says that an official connected with the city of Dublin Steam Packet Company found out long ago that two shillings extra on the weekly wages of the stokers when they did *not* make smoke, and one shilling fine when they *did* made them careful to push the red hot coals in the furnace well back, and feed the fresh coal near the mouth; thereby effectually preventing the making of smoke, and economising fuel. The company made money by the arrangement.

Hydrogen.

This element is very abundant and does not exist free or uncombined in nature. It is a constituent of all animal and vegetable substances, forming by weight one-ninth part of water, and is a portion of most combustible bodies. Hydrogen gas is colorless and tasteless, and when quite pure is without odor; it is inflammable when issuing from an orifice and intermixing with the atmosphere; burning with a faint violet color, giving great heat, but very little light.

This gas is the lightest substance in nature, being a little more than one-fifteenth part of the weight of air. It is an invariable component of coal gas, both in a free state and in combination with carbon, constituting certain hydro-carbons, such as light carburetted hydrogen (or marsh gas), olefiant gas, etc.

Hydrogen, for perfect combustion, requires eight times its weight or half its volume of oxygen, as already demonstrated by experiment, the result of the combustion being water; and in every case wherever artificial light is obtained by burning oil, tallow, gas, etc., this production of water is continually taking place, arising from the hydrogen intermixed with the material being consumed uniting with the oxygen of the atmosphere. The water is distributed as vapor in the atmosphere wherever produced, unless means be employed to condense and collect it. Whenever gas-lights are burned in a shop-window without proper ventilation, the vapors are condensed by the cold glass an inconvenience which is familiar to all; or a bottle of cold water taken into a room where lights are burning is speedily covered with a dew, caused by the condensation of the vapors by the cold water.

A simple way to obtain this gas is by passing a slow current of steam through a small iron tube (¾ or 1-in. gun barrel) loosely filled with iron borings; the tube is placed across a suitable furnace, or blacksmith's forge, and heated to bright redness; the steam on passing is decomposed into the two elements of water, viz, oxygen and hydrogen—the oxygen combining with the iron, forming the oxide of iron; while the hydrogen gas being set free, can be collected in a holder.

Another convenient method is, by putting a few pieces of zinc into a glass vessel, and pouring on them a mixture of one part of sulphuric acid and four or five parts of water; this gas then rises in bubbles. In this experiment the zinc unites with the oxygen of the water, and subsequently with the sulphuric acid, and the hydrogen is liberated.

Thus, hydrogen exists in solids forming part of animal and vegetable substances; in liquids, that is, as a component of water, and can be obtained in its gaseous state by decomposing one of its compounds, such as water, etc.—*Hughes on Gas Works.*

Our Mineral Wealth.

The known deposits of coal in the United States are greater in extent, and transcend in richness, all the deposits of all the rest of the world combined. Against 607,930,000,000 tons of estimated coal deposits outside of the Union, we have the magnificent offset of about 3,740,000,000,000 tons—if anybody can count the figures? Even little Maryland has five hundred square miles of coal lands, with a rich deposit, upon which the tax of twenty-five cents a ton would more that pay the whole national debt. As to iron, we have only to say that a single hill, known as Iron Mountain, in Missouri, rising 228 feet out of a base of 500 acres, presents a cone of 230,000,000 tons; and it is thought that every foot beneath its base level will yield 3,000,000 tons. The artesian augur, at the depth of 180 feet, is still penetrating solid iron ore. Pilot Knob, the base of which, 581 feet beneath the summit, is an area of 360 square miles, is known to be solid ore to the depth of 440 feet beneath the surface. Shepherd's Mountain, one mile west of Pilot Knob, is a mass of pure magnetic and specular ore, rising to the hight of 660 feet. A remarkable deposit of the magnetic ore, equaling the Iron Mountain in extent and richness, exists in New York, within thirty-two miles of New York city; Pennsylvania has grown rich and great by developing her inexhaustible iron and coal mines; but we are told that "the azoic belt of Lake Superior is the great iron region of the globe." Though yet undeveloped, it furnishes, in the single county of Marquette, in the upper peninsular of Michigan, one-eighth of the iron produced in the United States. The Lake Superior region is also rich in virgin copper and the best quality of ores. The Upper Mississippi and Missouri have large deposits of lead. The Pacific slope is everywhere rich in silver and gold, and mercury. Of the whole amount of gold contributed at the present day by civilized nations the United States contribute nearly one-half, and one-third of the whole product of silver. The production of the United States for the current year, it is estimated, will be $60,000,000 of gold and $20,000,000 of silver.

Electric Light.

Some recent correspondence between the Trinity House and the Board of Trade shows that the electric light at Dungeness can now be worked by either of the two engines, so that no disturbance occurs when one requires repairs. The service of the high-class engineers and firemen have been dispenced with, and the Elder Brethen have since been able to do that which the connexion of men with the trade union prevented —viz., to have their own ordinary keepers trained to drive the engine, as well as to attend to the lamps, a steady old experinced keeper being placed at the head of the establishment. The magneto-electric apparatus shown at the Paris Exhibition presents several improvements. The working by either of two machines showed that the power or the light can be duplicated in thick weather; and the engines were utilized for working the pumps of an air fog-trumpet.

The electric light was compared with the flash of a first-order revolving oil apparatus belonging to the French authorities; and at 15 miles' distance the Trinity-house engineer, Mr. Douglass, estimated the power of the fixed electric light at twice that of the flask of the oil light. The superiority of penetrating power of the electric light in fog was shaken by some experiments made by the Royal Engineers, but it turned out that this result, so different from all other experience, arose from a settlement in the wood-work supporting the electric lens, causing the lens to be out of its proper position.

Since the alterations made at Dungennes the light there has worked with great regularity and efficiency; and the Elder Brethren have proposed to place similar lights at the South Foreland Lowestoft, and Souter Point. The Board of Trade approve the extension of this mode of illumination to the South Foreland and Lowestoft, but at present suspend their decision respecting Souter Point. The committee of Elder Brethren who attended at the Paris Exhibition say: "As far as the eye is a test, the power of the English fixed light was considerably in excess of the French, and when both machines were in use and there was a good current, the fixed beam of the English light did not contrast unfavorably with the revolving one of the French, the flash of which is of great power. The contrast of the electric fixed light with the French first-order oil dioptric revolving light was very marked; indeed, the one may be said to put the other out.

"But the most beautiful feature of the electric was the extraordinary beam it gave. It shone night after night, large, steady, and lustrous as a planet, and you could see in the darkness a beam passing as far as the eye could see. Fram the tower, with the light at our back, it was very marked, and quite lit the hills round Paris. The whole horizon in the plane of the light showed the white beam, and at the distance of four miles it shone upon the windows of some houses, making them appear to be lit up. By extinguishing and relighting quickly several times this was very plain. Altogether the light was very remarkable, and the committee are glad to be able to report such an advance as the powers of the light show over that at Dungennes; indeed, the latter gives to the observer no conception of what the present one is, and it is satisfactory to know that the result of five years' work and observation, with imperfect and ill arranged apparatus, has now borne such good fruit, and that as England was the first to test and adopt this adjunct to the sources of lighthouse illumination, so she still retains her superiority. It is due, however, to Mr. Holmes to say that great as are the improvements already effected, he states that he is confident he can yet greatly increase the illuminating power before the present apparatus is re-erected at a permanent station."

Lighting Railroad Cars with Kerosene

We present below an extract from the report of the railroad committee of the Massachusetts Legislature, regarding the testimony taken before them upon the use of kerosene in railroad cars, and also the new law enacted by the Legislature.

This testimony was very important, as showing that the excitement of the past year in regard to the use of kerosene lamps in cars was entirely without foundation. Dr. Nichols, the well known chemist, and editor of the *Boston Journal of Chemistry*, testified that kerosene oil of the legal standard, viz., such as would not take fire below 110° Fahrenheit, could not explode, and was as safe as candles; that it could be easily tested; and that with such kerosene there was a positive assurance of safety. He further stated, that for many years he had experimented with burning fluids, and did not believe a serious accident ever occurred from kerosene which would stand the fire test of 110°.

It was also proved before the committee, by letters or telegrams from the officers of the roads, that in every instance where life had been lost by the burning of cars, the fire caught from the stoves and that candles were used for lighting. These were the accidents on the Pennsylvania road, on the Erie road, and at Angola. In all the other instances in which cars were burned, but not attended with loss of life, in some of which kerosene was used for lighting, the fires were believed to have been caught by the stoves, or by sparks from the stove or engine, except in one instance, where a lamp for generating gas from benzine was the cause. In no single instance was a car set on fire, nor was the fire in any way caused or increased by the use of kerosene. These included the cars burned on the Chicago and Northwestern; Chicago, Burlington and Quincy; Pittsburg, Fort Wayne, and Chicago; and a branch of the Erie road; making, with the others named, seven cases of the burning of cars, five of which were from stoves, one from sparks, and one from a gas-generating lamp; but not one from kerosene.

It was also shown by the roads leading from Boston, most of which were represented before the committee by their officers or by letters, that each road had used from one hundred to two hundred and fifty kerosene lamps in their cars for several years, and had never had the least accident from them. They stated, that they took care to procure the best kerosene oil: and some of them tested every barrel of oil which they purchased. Experiments were made with Tagliabue's pyrometer before the committee, showing that kerosene oil below the legal standard of 110° could at once be detected, and that any person could easily test the oil in a few moments, and ascertain exactly its quality or fire test.

After a full and thorough investigation, the railroad committee reported the following judicious bill, and it was adopted by the Legislature:

The Law of Massachusetts Concerning the Lighting of Railroad Cars.

SEC. 1.—No passenger cars on any railroad in this Commonwealth shall hereafter be lighted by naphtha or any illuminating oil made from coal or petroleum, or any illuminating oil made in part of naphtha or coal, or petroleum oil, or any other illuminating oil which will ignite at a temperature of less than 110° Fahrenheit, to be ascertained by the application of Tagliabue's or some other improved instrument.

SEC. 2.—Any railroad corporation which shall violate the provisions of this act shall be liable to a fine not exceeding five hundred dollars, to be recovered to the use of the Commonwealth by indictment.

Approved June 4, 1868.

Graphite in California.

The principal plumbago deposit of California, known as the Eureka Black Lead Mine, is situated in the west side of Tennessee Gulch, a tributary of Wood's Creek, about 1½ miles from Sonora, the county seat of Tuolumne county, and about 68 miles from Stockton, the head of navigation on the San Joaquin river. The mineral exists as a well-defined lode, from 20 to 30 ft. wide, having a dioritic foot-wall on the west, and a soft clay-slate hanging wall on the east. The trend of this lode is nearly northeast by southwest, and it dips very irregularly to the east, at some places being nearly vertical, and at others nearly horizontal It has been traced and explored for 3,900 ft., beyond which there are but faint indications of its existence. The whole deposit, including the walls and vein, is enclosed in the limestones peculiar to Tuolumne and the adjoining counties.

The graphite near the surface is much contaminated with the materials of the clay-slate, which rapidly decomposes on exposure to the atmosphere. It was this circumstance that delayed the development of the mine, as it was found impossible to separate the earthy matter from the more valuable plumbago. About two years since it was discovered that the graphite floated on the water, when a simple apparatus was employed which separates nearly 100 tons per day, giving employment to some 25 laborers to wheel the stuff from the mine to the arrastre, about 50 feet distant. This separating process is not now required, for in a large portion of the vein below the surface, at a depth of 40 ft., the graphite is cut out in solid blocks, and sacked without any further preparation; but is divided by lenticular bodies of clay-slate a few inches thick, and sometimes extended for several feet. This material is heavily charged with graphite, and is washed in order to separate it. At the depth of 50 ft. the graphite is exceedingly solid and hard, with a very fine lustre.—The whole material is taken out between the walls by an open cutting; all found not absolutely pure is washed, the other is bagged at once.

The product of the mine at present is about 1,000 tons per month, but is capable of an almost indefinite extension. The process of separating the graphite from the impurities is very simple. An inexpensive sort of large vat with a stone bottom 20 ft. in diameter, and 8 ft. deep, holds the materials which are stirred up by iron rakes, fastened to four cross-bars projecting from an upright shaft, moved by a water-wheel. When in motion a small stream of water passes into this vat, an outlet to which exists a few inches from the surface; through this outlet the graphite passes with the water, and is led by spouts into broad tanks, where it temporarily subsides, when the dirty water is run off, and a large stream of clean water forces the graphite into a series of shallow tanks, in which it is dried by the sun, the whole process requiring about five days to complete. The tanks and reservoirs at present used cover several acres. The cost of production of the solid plumbago at the mine does not exceed 94 cents per ton, two men in the lower workings being able to extract 10 tons per day of solid graphite, in blocks of any desired size. The water used on the mine costs but $50 per month, which sum is more than realized by gold found in the vat when cleaning up, there being a thin seam of auriferous quartz between the hanging wall and the graphite occasionally passing into it. Lumps of gold worth from $2 to $20 each, are sometimes found embedded in the graphite.—*Exchange*.

Petroleum.

The resources of Pennsylvania are not yet exhausted. Venango county—which produces nearly three-fourths of the oil that comes to our market—still pours forth its golden current of petroleum. If the streams come less copiously than of old as they really do, the more hopeful of oil men contend that it is not owing to a lack of oil, but that the decrease is occasioned by an overflow of water, forcing the oil from its natural beds up into hills and peaks which have not yet been perforated.

Thus an oil well lies in a valley, between two hills. At first the supply is ample. It spouts out gallons per minute, and barrels per hour. But presently the production decreases, until at length it ceases—becomes dried up—altogether. This is owing to a flood of water, rising uniformly through the land, forcing the oil through its top; and as the valley has been bored, it being the lowest portion of the land, is of course first deprived of its oil. If more is wanted, of course you must perforate the hills, where, according to the same theory, the water, with the oil on its surface, lifts it upward to the acquisition of man. We heard nothing as to what would happen after all the water was also expanded. Is there oil below it, or what will be the nature of the next profit cast up to view?

If the existing oil springs should fail, of course there is no danger that the country or the world will fall short of oil. The article has only been discovered in four or five States, and we have others left wherein to "prospect" for new discoveries. There is oil in Ohio, Indiana and Illinois; there comes an old murmur from Wisconsin, Nebraska and Kansas: oil has been discovered in California. Young America, with his enterprising caduceus, has smitten the gold veined rocks of the Pacific coast, and they have spouted forth oil, as did the rock of Syria at the stroke of Moses' wand, when his followers were athirst in the desert. The location of oil may be determined only by the geological formation of the ground, but there are many places in the broad compass of the United States where one can dig for oil, and dig hopefully.

Petroleum may justly be considered as one of the greatest blessings ever bestowed by Providence on man. It increases our national wealth, gives employment to our railroad and shipping interests, and supplies the place of gold as a purchasing medium in foreign markets. Its magnitude cannot be estimated by the immense amount of capital nominally employed by the large number of companies already organized, which in our principal cities alone has already reached the enormous sum of over $500,000,000, exclusive of a large number of private companies, whose existence is entirely unknown.—*Mer. Jour., July* 2.

EMPLOYMENT OF HYDROGEN GAS.—M. Heurtebise communicates to a late number of *L'Invention* a plan for producing and economically employing hydrogen gas, which is both new and valuable. He places charcoal in a retort and raises it to a red heat, then passing a stream of carbonic acid over it, each molecule of the acid absorbs two atoms of carbon, forming two molecules of oxide of carbon. In another retort, heated red hot, he passes two currents, one thus obtained, and another of superheated steam, when two atoms of carbonic acid and two equivalents of hydrogen gas result. The carbonic acid gas is again passed over the heated charcoal and four equivalents of hydrogen are obtained. A continuous action is thus kept up, with a steady supply of hydrogen.

Carbolic Acid in Tanning.

Prof H. Dussauce, who has been experimenting upon the use of carbolic acid in tanning of leather, communicates the conclusion arrived at to the *American Artisan*, as follows:

1. Tanning vats, with the addition of carbolic acid, can be left any length of time to the air without destruction of the tanning properties of their contents.
2. The tannin being present all the time in its pure state, less bark is required.
3. Vats prepared with bark moistened with water and carbolic acid keep their strength until all the tannin is combined.
4. Extracts prepared with it will keep without destruction of the tannin.
5. Leather tanned in such baths acquires imprutescible properties, and can be kept in damp places without alteration.
6. The bad smell generally emitted in tanning, currying, gut dressing, shops, etc., is avoided, and the use of this acid is preferable to chloride of lime, this latter emitting a strong odor generally very disagreeable.
7. Leather made by this process takes some of the properties of Russia leather.
8. The work can be pursued at any time of the year, putrefaction being avoided.
9. One-eighth of the quantity of bark can be saved, and the time of tanning can be reduced at least to one-sixth.

The *Scientific Press*, of San Francisco, in alluding to the above says: "Prof. D. prepares pure carbolic acid from the heavy oil resulting frem the distillation of coal-tar, that is, the oil boiling between 302° and 304°. This is treated with an excess of caustic soda, heated, and left to settle. The clear liquid is a concentrated carbonate of soda. It is decanted, dissolved in five or six times its volume of hot water, well stirred, and left to cool. The clear part is drawn off, and a little excess of hydrochloric or sulphuric acid added to it. The carbolic acid separates and swims on the surface of the liquor. It is decanted and washed with cold water, and is then ready for use. A simple method of preparing it for tanners' use is to put a barrel of coal-tar from gas works into a large hogshead, and fill it with lime water. Stir it well and let it settle. Decant the clear liquid—which may be used at once."

Prices of Gas Coals—July 11.

PROVINCIAL.

	Duty, $1 25 Coarse. Gold.	Slack. Gold.
Block House	$1 75	$0 75
Gowrie	1 75	0 75
Lingan	1 75	0 75
Sydney	2 13½	0 71½
Pictou	2 13½	1 18½

AMERICAN.

	Coarse. Currency.	Slack.
Westmoreland Co.	$8 50	$8 00
Despard Coal Co.	8 25	8 00
Penn	8 50	8 00
Newburgh Orrel Gas.	8 50	8 00

Delivered in New York.

PRICES OF FOREIGN COALS—DUTY $1.25 PER TON.

Corrected weekly by Parmelee Bros., 35 Pine st., N. Y.

Liverpool Gas Caking	$ 9 50
" " Cannel	14 00
" House Cannel	18 00@19 00
" " Orrel	16 00@18 00

Per ton 2240 lbs., Ex. ship.

PRICES FROM YARD.

Liverpool House Orrel, scr'd	$18@$20
" " Cannel, scr'd	$22

Per ton, 2000 lbs. delivered.

COMPUTING INTEREST.—A new method of computing interest on any number of dollars at six per cent. appears very simple. Multiply any given number of dollars by the total number of days on which interest is desired, separate the right hand figure, and divide by six; the result is the true interest of such sum for that time, at six per cent. This rule is so simple and so true, according to all business usage, that every banker, broker, merchant, or clerk, should post it up for reference and use. There being no such thing as a fraction in it, there is scarcely any liability to error or mistake. By no other arithmetical process can the desired information be obtained with so few figures.

Hydrostatic Sluice-gate.

The apparatus invented by Mr. W. Edwards, C. E., and exhibited by Messrs. Turner, of St. Peter's Iron Works, Ipswich, consisted, says the *Mining Journal*, of a gate made in wrought or cast-iron, having a ram or plunger attached to each end of the upper crosspiece, working in upright cylinders, the forcing of water into which, by means of a small force pump raising the gate, which shuts against a frame, composed of two uprights attached to the cylinders and a sill upon which they stand. It is kept in position when up by a pair of vertical guides, mounted on the heads of the cylinders. Two graduated scales made in brass are fixed to the guides, divided into feet, and 100 parts of a foot; a venier attached to the gate points to one scale, showing the lift of the gate in feet and decimals; the other scale is read by a venier attached to a float, thus indicating the depth of the water-head with the same accuracy. The quantity of water in cubic ft. discharged per minute by the sluice may—with the aid of hydraulic tables—thus be accurately ascertained. The apparatus is simple in construction, the gate itself being the only moving part except the pump, and is thus not liable to be out of repair. The pump is placed in an iron box, which may also contain the regulating cocks for adjusting the rise and fall of the gate; these being kept under lock and key, the supply can only be regulated by the officer in charge, who would have possession of the key.

Street Watering.

Mr. J. W. Cooper has patented an improved system of watering the streets, which is being tried in the parish of St Marylebone (Eng.) and elsewhere, and promises to be successful. He introduces in the ordinary carts, when charged with water, a mixture, in suitable proportions, of fused chloride of calcium and chloride of sodium (common table salt). These salts, as is well known, are highly deliquescent, especially the chloride of calcium. When such a solution is applied to the roads, the retention of moisture by the chlorides serves to keep them in a damp condition for a much longer period than when ordinary water is used. By the present system of *deluging*, three applications daily are scarcely sufficient in warm dry weather to prevent the dust from blowing, whereas *one* application of Mr. Cooper's composition at intervals of two or three days will, it is said, effectually accomplish this object, and at a much less expense. The dust in the large rooms of warehouses and similar buildings might doubtless be effectively controlled by adding a little of these salts to the water used.

UTILIZATION OF COAL.—For many years past the subject of utilizing the vast quantity of small coal which is daily accumulating, both under and above ground at our collieries, has engaged the attention of some of the most eminent men of the country, it being generally felt that if a practical plan could be discovered to make the waste coal marketable, vast benefits not to the coal owner alone, but to the nation at large, would be the result. It is satisfactory, therefore, to be able to report that the Uskside company, Newport, Monmouthshire, have recently erected, at a colliery in the forest of Dean, a patented machine, capable of converting 100 tons per day of small coal into bricks of patent fuel, and the experiment has proved a complete success. The machine is constructed with moulds, linked together so as to form an endless chain, which is carried forward by an ingenious motion under presses, where the coal dust is subjected to a pressure equal to eighty tons, which can be varied if necessary. The same firm is now engaged in constructing another machine for the same purpose. The cost of manufacture is comparatively small, and the price at which the fuel sells leaves a handsome profit on the outlay. When it is considered that most of the coal dust suitable for this fuel has hitherto been reckoned as worthless, the importance of the invention can hardly be overrated.—*London Colliery Guardian.*

—There is no absence of coal in the great West, out of which new States are made. In the Laramie plains the coal beds are from five to eleven feet in thickness, and occupy a basis of about five thousand square miles In Colorado, along the eastern base of the mountains, north of the Arkansas river, beds of solid lignite extend over many thousand miles of territory. They are the remains of extinct forests, and show that oaks, hickories, lindens, maples, buttonwoods, buckhorns, poplars and magnolias, have flourished there. The beds are younger than the anthracite beds of Pennsylvania, belonging to the geological period immediately preceding the present. There is no other fuel of any kind, under or above the surface, in the region where these are found.

Correspondence.

The Proposed Convention.

TIFFIN, OHIO, July 9, 1868.

MESSRS. EDITORS: Please find enclosed $3 for another year's GAS-LIGHT JOURNAL. Am glad to see the old heading again; 'tis the "old familiar face" of a friend and a feeling of suspicion, which her apparent coqueting with the petroleum interest naturally gave rise to, will now doubtless pass away, and the Journal receive the support to which it is fairly entitled from the gas interest, which is fully able to sustain it.

In the matter of the proposed Convention I disagree with the gentleman from Massachusetts, as to New York or Philadelphia being more convenient to a majority, unless the small works are counted out. I certainly think a central location—Cincinnati, Cleveland, Toledo, Pittsburg, or even Buffalo, would be easier of access to the majority, than have all travel to the seaboard. It is hardly fair to ask men from the far West to do all the travel, or be cut off from the advantages of the Convention, the want of which is felt more severely by managers of small works than by those of large works, who have every other available means of information within their reach, and from which their less fortunate brethren are cut off—and are they not liberal enough to meet us part of the way? I hope so. The large works are mainly on the seaboard; the small ones, and by far the most numerous are west, even to Kansas. And while it is true some other business may be found East, would it not be advisable to defer all other than belongs legitimately to the Convention.

Yours respectfully,

MACHINIST.

GAS WORKS, TRENTON, N. J., July 8, 1868.

MESSRS EDITORS: Enclosed please find three dollars to pay our subscription for one year in advance for the GAS-LIGHT JOURNAL.

I am glad you have put the old name at the head again. I never felt reconciled to seeing "Petroleum" taking precedence in our own paper.

Very truly yours, J. S. CHAMBERS,
Treas. Trenton Gas Light Co.

Smedberg's "Synopsis of Gaslighting."

HAGERSTOWN, MD., July 13, 1868.

MESSRS. EDITORS: I take the pleasure of acknowledging the reminder in your last issue that "time's up,' in forwarding money order for three dollars, which I believe will square accounts up to March, 1869.

Please enter my name on your list for "Synopsis of British Gas Lighting." I agree with the suggestion made in your last respecting the Convention, and will vote Philadelphia. Respectfully yours,

GEO. COLES, Sup't.

The following additional subscribers to "Smedberg's Synopsis of British Gas Lighting" have been received, making 186:

J. Simpson Africa, Treas. Huntington Gas Co., Pa.
George Coles, Sup't Hagerstown Gas Co., Md.
Peter D. Lacey, Worcester Gas Co., Mass.

Fodel's System of Bookkeeping.

The following subscribers to "Fodel's System of Bookkeeping for Gas Companies" have been received:

J. A. Hadley, Sup't Meriden Gas Works, Conn.
G. S. Harris, 44 Main st., Mansfield, Ohio.
Chas. H. Boyle, Sec'y Kansas City Gas Light and Coke Co.
Cyrus J. Van Gorder, Warren, Ohio.

—One thousand feet of ordinary illuminating gas can be readily compressed into a space of ten feet.

—Mercury conducts heat more slowly than any other metal. If the heat-conducting power of silver is at 100, that of mercury is only 3·54, or about 28 times less than silver.

Petroleum in Europe.

Mineral oils are now found and worked in other countries besides the United States; just now, Galicia is attracting attention as a valuable source for these oils. In West Galicia mineral oil abounds; the principal petroleum reservoirs in this tract are found in the mountains enclosed by Limanowa, Neusandec, Grybow, Cieskowice, Gorlice, and Sbyszyce, covering an area of about 20,000 hectares. The ground is so charged with mineral oil, that it frequently issues in the form of springs, and it always suffices to bore ten or fifteen feet below the surface, to encounter the valuable substance. Despite the primitive modes of extraction employed, Western Galicia was able to extract in 1866 about 268 tons weight of petroleum. Several American engineers have visited the country; according to their accounts, the little river Dunajec has a fair chance of becoming the European oil creek. Geologists and engineers who have carefully examined the country on all sides, consider the petroleum of Eastern Galicia to resemble that of Canada, while that from the western part of the province is almost identical with Pennsylvanian oil. In this latter portion, namely the western, there are sources of oil which the American wells do not yield in purity and abundance; worked with intelligence, they would doubtless yield such fortunes as those in America have.—*Drug. Circular.*

Effect of Exposure on Coal.

Prof. Rockwell has called attention to the deterioration which coal suffers from exposure to the weather, and to the importance of keeping it as dry as possible. Anthracite suffers the least, bituminous the most. According to the experiments of Grundmann, coal exposed to the weather in heaps lost during a period of nine months 50 per cent. of its value as fuel, and about as much as a gas making material; it undergoes a process of slow combustion, taking up oxygen and giving off the volatile products of oxydation—air and moisture playing the principal part, and warmth promoting it; the valuable combustible ingredients are lost, and the injurious ones, as sulphur, oxygen and ash, are relatively increased. Coke from weathered coal is of inferior quality, losing its coherence. The facts have been generally understood for a long while, but the practice in some railway yards gives no heed to the loss of heating values which coal undergoes from exposure to the weather. It is found with no covering to shield it from the rain, wind, and snow and its exposure and loss thereby seems to attract no attention from the very "practical" men who have care of this department. Neither wood nor coal can bear long exposure to the elements without losing a large share of its real value as fuel.—*Am. Railway Times.*

Heat without Coal.

Mr. H. W. Pond, of Newark, N. J., says the *Scientific Press*, remarks that economists have speculated on the possible discovery of some method of producing heat independent of coal, and the decomposition of water has been regarded as a probable expedient. With our present knowledge and appliances it appears not to be difficult to realize the proposition, even in competition with coal—at least in a small way. The agents are obvious—wind-power, a magneto-electric machine, for the decomposition of the water, and oxygen and hydrogen gasholders. The result would be that oxygen and hydrogen would be available for the production of the heat which would be required. For use in the arts the oxy hydrogen furnace would of course offer advantages far above any other known, and results could be reached impossible with the lower temperature of the coal fire, while the flame would be free from deleterious substances common to coal. Owing to its gaseous form, and the intensity of its heat, this fuel would be manageable in many ways impracticable with coal. For instance, seams could be hard-soldered with great rapidity with the jet of the compound blow-pipe, and it is probable that the joints of steam boilers could be heated for welding in a suitable oxy-hydrogen jet.

—The Allentown (Pa.) Rolling Mill is one of the largest establishments of the kind of Pennsylvania. It is for the production of railroad iron exclusively, and turns out four hundred tons of rail per week. The daily work is 260 rails, 30 feet long, and weighing 56 lbs. to the yard, or 550 lbs. each.

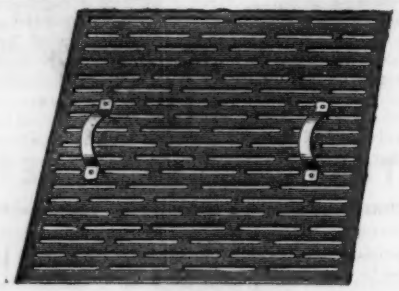
Miscellanea.

—The novel experiment of moving a house by water was tried at Bridgeport, Ct., with success the other day. A large house was launched and floated through the draw and down the river, landing safely in East Bridgeport, its destination.

—Dr. Lunge gives in *Dingler's Journal*, a method of making an excellent black varnish for iron-work. He distils gas-tar until nearly all the volatile products are got rid of. He then stops the distillation, and dissolves the residual pitch either in the heavier oils, or, if a very quickly drying varnish is required, in the light oils or naphtha. This varnish is, of course, the original tar minus the ammonia, water, carbolic acid, and other things which give it its disagreeable odor, and make it so long in drying.

—The use of hydro-carbon fluids, for the purpose of improving the illuminating power of gases, continues to form the subject of patents. Mr N. F. Taylor, of Stratford, Eng., gas engineer, has recently specified a patent for certain means or apparatus, to be used for the purpose of impregnating air and aeriform fluids or gases with hydro carbon, and also for burners used in the burning of inflammable air obtained; these burners, says the patentee, are also applicable when burning other gaseous fluids.

—An improved burner which is to be employed, is thus described in the London *Mining Journal*. This burner is formed of two or more eccentric rings, through which the aeriform fluid or gas escapes, for the purpose of ignition. Each of these rings is formed internally with one or more sets or series of teeth or divisions, between which the aeriform fluid or gas is driven through the outlet, for the purpose of uniform distribution to such outlet, the said outlet being formed of a narrow annular groove.



ARNOLD'S

METALLIC GAS TRAYS.

These Trays are made of sheet metal galvinized or tinned to prevent oxydization. Warranted to wear longer and to be cheaper in the end than any Tray known. They are light, cheap, easily kept clean, and almost imperishable.

Manufactured and sold by T. G. ARNOLD,
191-215.) 334 and 336 West Twenty-first-st., N. Y.

THE DESPARD COAL COMPANY

OFFER THEIR SUPERIOR

DESPARD COAL

To Gas Light Companies throughout the country.

Agents, PARMELEE BROTHERS, No. 32 Pine street, N. Y.
BANGS & HORTON, No. 31 Doane street, Boston.
Mines in Harrison County, West Virginia.
Wharves, Locust Point, } Baltimore.
Company's Office, 29 South street, }

Among the consumers of Despard Coal, we name: Manhattan Gas Light Company, New York; Metropolitan Gas Light Company, New York; Jersey City Gas Light Company, N. J.; Washington Gas Light Company; Portland Gas Light Company, Maine.

*** Reference to them is requested. 204-1y

A RARE OPPORTUNITY

TO IRON WORKERS, TIN MEN OR GAS-FITTERS IN ANY OF THE GREAT CITIES.

The Editors of this Journal announce that they have made arrangements with the Patentee of the valuable inventions already described in these columns, and known as the Cambridge Gas Furnace, Gas Stove, Gas Oven and Gas Range, to secure their more general use and introduction; and that they are now authorized to lease or sell licenses for the manufacture and sale of the same, to responsible persons, on very favorable terms. For circulars and information, apply at this office.

☞ Our readers are assured that an opportunity for great profit is herein presented. 203

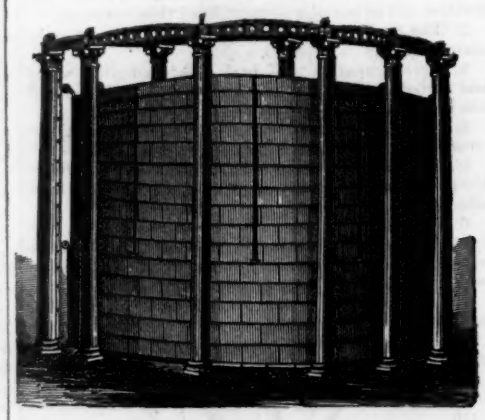
T. F. ROWLAND.

Continental Works,

Greenpoint, Brooklyn, N. Y.

NEW YORK OFFICE, 171 B'WAY, ROOM 9.

ENGINEER, AND MANUFACTURER OF



GAS-HOLDERS

OF ANY MAGNITUDE,

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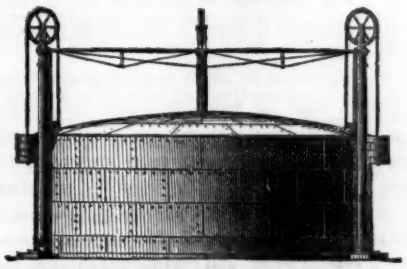

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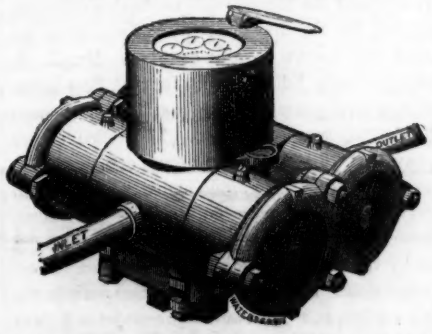

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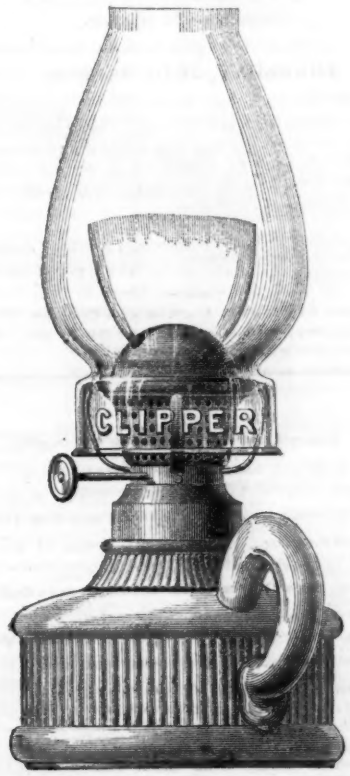

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Published on the 2d and 16th of Each Month

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M. L. CALLENDER & CO.,

EDITORS AND PROPRIETORS.

THURSDAY, JULY 16, 1868.

WISHING TO MAKE this Journal an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of those subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS* or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

☞ NEWS AGENCY.—The American News Company, 119 and 121 Nassau street, New York, are agents for this Journal. News-dealers will please send orders to them.

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Answers to Correspondents.

G. A. of Pha.—You can make your lamp wick in the manner proposed, so as to answer all the requirements. Paper when unsized is porous.

S. A. T., of N. Y.—The expansive power of mercury is practically irresistable. A column of mercury in a tube will give you all the power required. By using three columns the motion may be made continuous.

N. A. L., of Conn.—Pure water acts upon lead, converting it into white lead, or carbonate of lead. The change is doubtless effected by the action of carbonic acid which pure water absorbs from the atmosphere, if from no other source.

A. P., of Ohio.—Platinum is the least susceptable metal to heat. Zinc is the most susceptable. Gold may be purified from silver by quartation; that is fusing it with three times its weight of silver, and then acting on the mass with nitric acid; the gold is left as a dark powder, and may be fused after being washed.

CURE FOR WHOOPING COUGH.—Physicians in Hartford, Conn., have adopted with marked success a new method of treatment for curing children afflicted with whooping cough. The juvenile patients are taken on a tour of inspection to the city gas works, and while intently engaged in witnessing the various processes employed in manufacturing their evening's artificial illumination supply, they breathe the not very pleasant air of the gas house. In some way, not very clearly understood, the inhaling of this air is found to cure or greatly alleviate the complaint. This ingenious method of benefitting the youthful mind and body simultaneously, has become immensely popular in the place, the people at the gasworks asserting that during the last twelve months no less than three hundred cases have been experimented upon, the results, generally, being of a most favorable character.

GAS MOTOR.

The advantages to be obtained by the introduction and use of some form of gas-engine are so great and so numerous as to suggest themselves to every practical man.

For the multitude of small industries requiring small power, such as pumping water for private houses, hotels, railway stations, etc., sawing wood, driving exhausters, and pumping at gas works, for printing newspapers, and in job-offices, grinding grain, coffee, spices, etc., driving sewing machines, lithographic embossing, and stamping machines, hoisting goods in public and private warehouses, for lifting passengers and luggage at hotels, and for a thousand other purposes.

The gas-engine is simple in construction, as no boiler or furnace is required, therefore there is no danger of explosion or fire, and insurance companies make no discrimination where they are employed, because there is no risk.

At the present price of gas this engine is not expensive, when its various advantages over steam are considered—even for a constant power. But in the various conditions where power is required temporarily or intermittent, it is unquestionably cheaper than steam power, because the expense ceases the instant the power ceases.

The gas-engines most known and approved are the Lenoir and the Hugon engines; both are French inventions, but the first named has been most introduced and known in this country. Mr. J. B. Murray, formerly Editor of this Journal, first introduced it several years ago, and is still doing so with much success, we understand. The office of the company is at 26 Pine-street, New York.

The principle of the engine consists in using an explosive mixture of gas and air, which is introduced instead of steam into a cylinder to operate the piston by the force of its expansion when exploded. The explosion is caused by the electric spark in the Lenoir engine, and by an automatic gas jet or lighter in the Hugon. Of course it will be readily understood that each movement of the piston is caused by an explosion of the ignited mixture of gas and air, (about one of gas and nine of air) and transmits power precisely as steam does. But how much more simply! No boiler, safety-valves, pressure-gauges, and no need of an expensive engineer; any one can run a gas-engine by turning a gas-cock as you would to turn on your gaslight.

Hydrocarbon Gas or Hydrogen.—By the use of the cheap gas made by the hydrocarbon process, or the hydrogen alone as made by the Gwynne-Harris method, there is no doubt a motor can be obtained far cheaper than steam, and possessing all the excellencies before mentioned. It is not too much to predict that the day is not far distant when the gas motor will take the place of steam in all our principal towns and cities; and its exceeding economy, simplicity, and convenience will cause *gas-power* to be used in ten places where steam is employed in one at present.

The pipes to convey this element of light, heat, and power will ramify every street and lane, and stand awaiting the signal of a touch to bring it into instant operation, whether it be to light and warm us and perform all the culinary and other mutations where heat is employed, or put in motion the thousands of machines and labor-saving mechanism which shall take from toil its terror, and make existence even to the poor a prolonged luxury.

☞ Reader, if you have any items of interest on the subjects to which this Journal is devoted, send them to us, and they may be the means of benefitting some of our numerous subscribers.

EDITORIAL ITEMS.

NOVEL FILTERS.—The *Journal of the Franklin Institute* for May says: "Among the novelties exhibited at the last meeting of the Institute, were shown by Professor Rogers some very ingenious filters, brought by him from Paris, consisting of a hollow block of very porous stone or coke, closed by a cork, through which a glass tube, connected with one of india-rubber, was inserted The stone being sunk in the solution which it is desired to filter, and the air being drawn out by the mouth from the other end of the tube, the water or solution then syphons over, and most of the impurity is arrested by the porous substance."

These ingenious filters above mentioned are not of French origin, but were first invented and known and, we believe, patented in this country about 1861. Very similar instruments, consisting of small cylinders of a sort of artificial porous stone, and provided with a small rubber tube and metallic or ivory mouth-piece, all enclosed in a little case to go in the pocket, were common in market, and recommended for the use of our soldiers during the late war, and for travelers, etc.

They were used by inserting the porous cylinder in the spring or stream, and placing the ivory tip in the mouth and exhausting the air until the fluid, fully purified, entered the mouth. An improvement was also known in the material called the "Pocket Charcoal Filter," wherein charcoal was employed to form the hollow cylinder by some process of conglomeration or cementation.

THE COLLEGE COURANT.—We have received the first number of the fourth volume of an excellent paper bearing the above title, having for its motto "*Perseverantia Omnia Vincit*," published weekly at Yale College, New Haven, Conn. The *Courant* "will be devoted to college news and literature, and will be contributed to by the ablest writers among the Professors in the colleges of the United States." It will have four distinct departments, viz., College News, Scientific, Yale Alumni, and Undergraduate. Aside from these departments the *Courant* will contain much miscellaneous matter that cannot be classified under any particular head. There is a long list of Professors of the different colleges in the United States, who are contributors.

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Their journal is exceedingly well gotten up—is about 100 pages, and has an extensive list of advertisements of business houses of great value to foreign buyers. We consider this something well worth imitating here by some of our enterprising business houses.

☞ We are in receipt of the annual report of the Sewerage and Water Commissioners of the city of St. John, N. B., for the year 1867, extracts from which we will publish in our next issue.

☞ Our readers will notice in the advertisement of Messrs. Herring & Floyd, on page 28, an illustration of "Floyd's Patent Adjustable Main."

THE AUCKLAND GAS-WORKS, NEW ZEALAND.

We have received the report of the Auckland Gas Company, New Zealand, which we publish herewith in full as a matter of curiosity, and to give an idea of the large and universal circulation of our Journal. One of our advertisers lately received an order from Frankfort on the Main, Germany, and another had one from St. Petersburg, Russia. We have patrons in Japan even.

Organized	1865.
Amount of Capital	£30,000
President	Frederick Whitaker.
Engineer and Secretary	J. N. Wark.
Number of Public Lamps	40
Number of Public Meters	450
Miles of Main	7
Gas registered during 1867	7,250,000
Gas made per ton carbonized in 1867	10,000
Average daily product per retort	about 5,000
Price to consumers per 1000 cubic ft	$5.00
Retorts used	Clay.

AUCKLAND, NEW ZEALAND, May 28, 1868

AMMONIA IN GAS METERS.

Consumers of gas sometimes wonder what it is in the water of their wet gas meters, when drawn after long usage, that gives it a sort of saline or alkaline property. It is simply ammonia—the base of the article which druggists sell under the name of *aqua ammonia*—and the ingredient which gives the peculiar pungency to the old-time bottle of "smelling-salts," or more modern sal-volatile and *vinagarette*, which are carbonates of ammonia.

Dr. Gunning, of Amsterdam, asserts that coal-gas, however well purified, is by no means free from ammonia. From a series of experiments he found that every 1000 cubic feet of gas contained a little over one cubic foot of ammonia or ammoniacal substances. Hence, where wet gas meters are in use, the water, being rarely changed, must in time become fairly saturated with ammonia.

EXPLORING EXPEDITIONS.

A prominent feature of the age seems to be in the number of exploring expeditions progressing in various directions and to the most remote quarters of the globe. And so important have come to be the employment of the explorer and discoverer, that rivalries have sprung up between nations to produce the best of these modern heroes. It may be objected by some that these expeditions savor more of curiosity than of practical value; but this is a narrow and mean view of the subject. Aside from what these explorations accomplish for the interests of civilization and the concerns of science, they are often the forerunners of important colonies, and connect with great designs of trade and power. Even now the heroic Livingstone is returning with accounts of extensive and fertile regions around the great fountain lakes of the mysterious Nile, which we had supposed to be mere illusions.

Our own country has its tasks of exploration, and we would like to see it catch something of the spirit of the age. North America and its islands form a vast field where the European explorers will scarcely come to compete with our own adventurers, who are peculiarly qualified for the task. The memory of Kane is a glory of our people, and an inspiration to the ambition of our youth. The career of the explorer is one that requires rare and admirable qualities, and is essentially philanthropic; it has no destructive mission; but it requires courage as lofty as it is beautiful. And it is a question whether the modern explorer is not the highest development of human heroism.

NOTICE.

We desire to obtain the following numbers of the GAS-LIGHT JOURNAL, to complete our files. Those of our readers who have the numbers mentioned below to spare, will confer a favor by communicating with us at their earliest opportunity, stating price. Also any one having full volumes to dispose of.

VOL. 4.—No. 64, Aug. 15, 1862; No. 67, Oct. 1, 1862; No. 70, Nov. 15, 1862; No. 74, Jan'y 15, 1863; No. 75, Feb'y 1, 1863; No. 80, April 15, 1863; No. 83, June 1, 1863.

VOL. 5.—No. 85, July 1, 1863; No. 86, July 15, 1863; No. 87, Aug. 1, 1863; No. 89, Sept. 1, 1863; No. 91, Oct. 1, 1863; No. 93, Nov. 1, 1863; No. 94, Nov. 15, 1863; No. 95, Dec. 1, 1863; No. 96, Dec. 14, 1863; No. 98, Jan'y 15, 1864; No. 99, Feb'y 1, 1864; No. 100, Feb'y 15, 1864.

VOL. 7.—No. 139, Sept. 15, 1865.

VOL. 8.—Oct. 2, 1866.

VOL 9.—Oct. 16, 1867; Jan'y 2, 1868; Feb'y 2, 1868; Feb'y 17, 1868.

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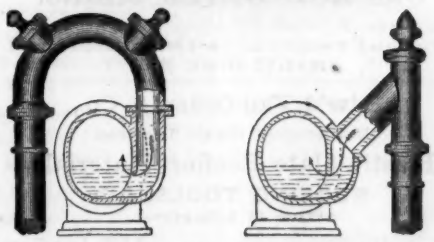

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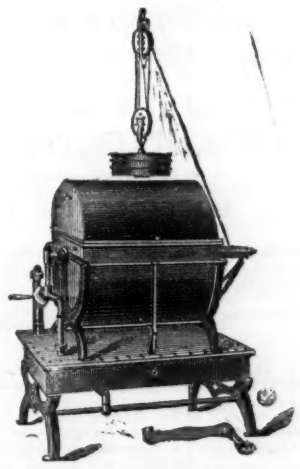

We manufacture eight sizes of the SOLAR GAS MACHINES, ranging from ten to five hundred light capacity. Every machine is put in operation and fully tested before it is sent off, and is guaranteed to give perfect satisfaction.

TESTIMONIALS.

SOUTHBORO', March 29, 1867.

Messrs. O. P. DRAKE & Co., BOSTON:

Gentlemen: I will say that I had your Gas Machine in use about nine months, manufacturing gas for lighting my store. The light is good, clear, and at all times reliable. Its cost is less than half the cost of street gas. As regards safety, I think it very much safer than kerosene lights. Yours respectfully,

WILLIAM C. BARNES.

LAKE FOREST, ILL., Aug. 30, 1867.

CHAS. MATTHEWS, ESQ.,

Ag't for Drake's Solar Gas Machine, Chicago:

Dear Sir: * * * * * * * * * I would say that I have had the machine in constant use for the last six months, and am well pleased with it. The light is clear and steady, and the whole apparatus works to my entire satisfaction. Yours,

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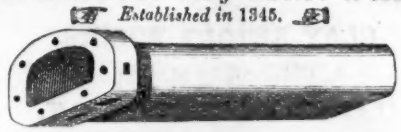

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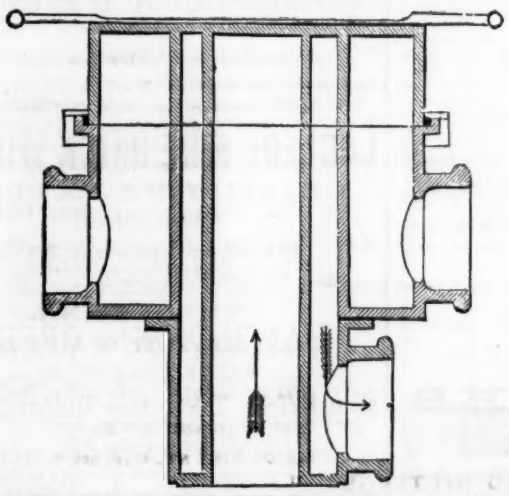

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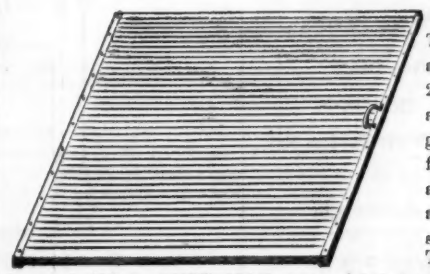

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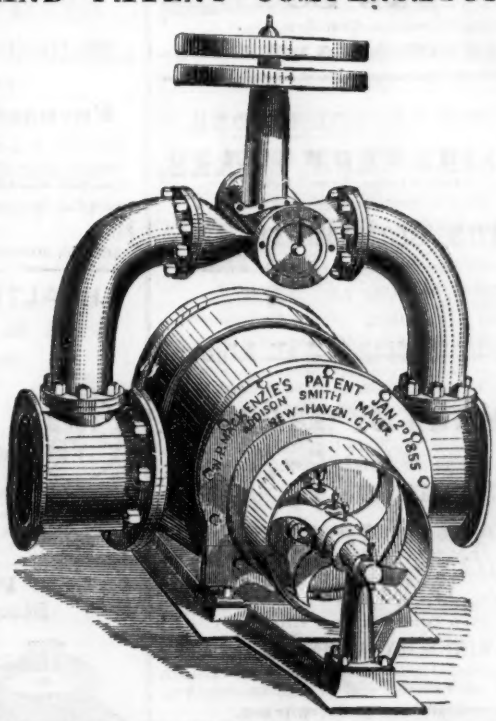

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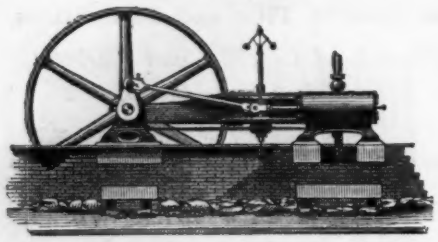

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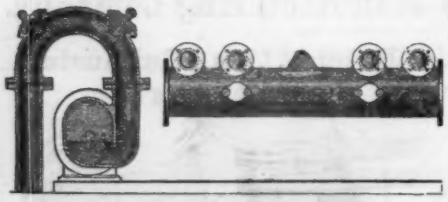

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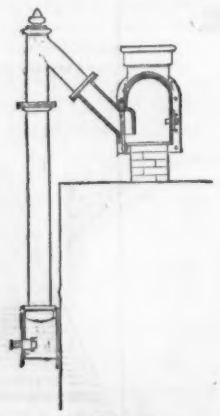

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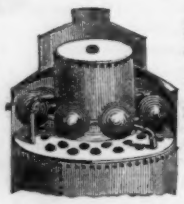

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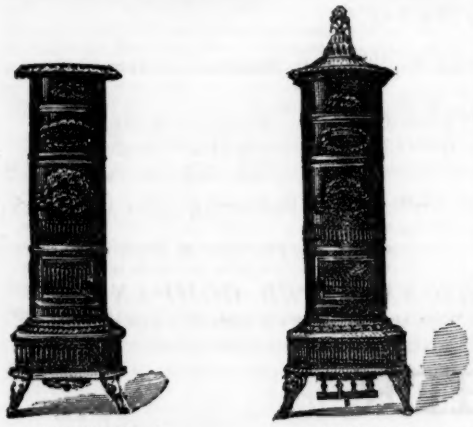

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Fig 5

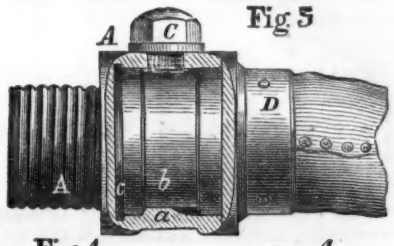


Fig 4

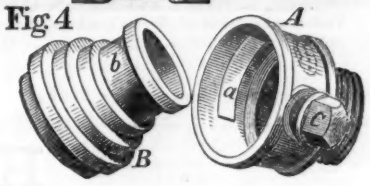
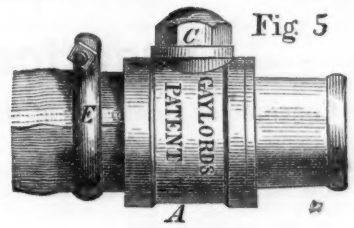


Fig 5



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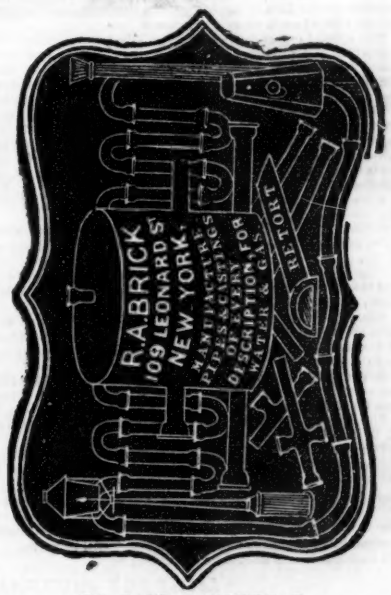

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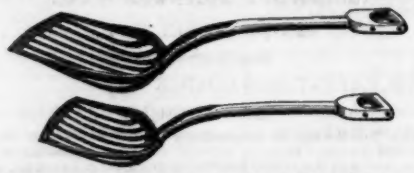

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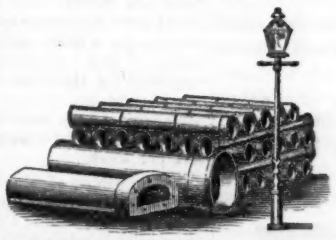

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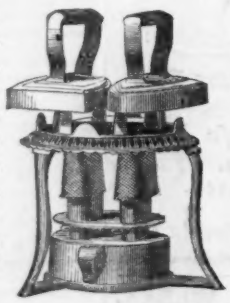
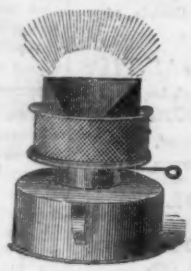
Few branches of invention have received greater attention with a view to improvement than that including lamps and burners intended for domestic and other purposes, as the market, open to any really valuable improvement in this department, offers great inducements to inventors. The useful invention herewith illustrated is among the latest brought forward, and is designed for use either for lighting or heating purposes, as may be required.



In the engravings, Fig. 1 represents a lamp furnished with a double burner, and used for heating purposes, as, for instance, in heating sad-irons; Fig. 2 indicates one with a single but similar burner designed for like purposes; and in Fig. 3 the burner is shown as adapted for purposes of illumination.

The burner, attached to a suitable lamp or oil reservoir, may be briefly described as having its base perforated with numerous small holes, and furnished internally with a flat wick-tube which extends upward through the top-plate of the burner, such top-plate being perforated to permit the passage of air at either side of the wick-tube; furthermore, a sheet metal cap, formed with inclined sides and having a longitudinal slit on its top, is fitted over the wick-tube, and over this is placed a case made of perforated sheet metal or equivalent formiuated material and open at the top. When the apparatus is used for heating this case should extend considerably higher than the cap, but when employed for lighting purposes its hight is greatly reduced. The wick of the burner is ignited by removing the cap and case,

and the former being replaced the oil as it rises in the wick is volatilized by the heat radiated inward from the cap, whereupon the case is replaced, and the vapors, being mingled with air passing up through the perforations of the base and top-plate, enter the case and are lighted at the top of such case, the flame being, as it were, transferred from the top of the wick-tube to the top of the case, and the continued volatilization of the oil from the wick being secured by the inward radiation from the heated cap. By these means a very perfect combustion of the oil is secured, and a simple and neat device for either of the purposes indicated is obtained.



This apparatus was patented April 7th, 1868, by the inventor, Luther Erving, of Brooklyn, N. Y., and is manufactured by the Union Gas Stove Company, No. 126 Fulton Ave., in the same city, where all further information relating to the invention will be furnished upon application.

Manufacturing Items.

—We understand that a gas-work will shortly be rected at Long Branch, N. Y.

—A boot and shoe manufacturer at Troy employs 30 hands and turns out 12 cases of goods per week.

—Little Rock, Arkansas, is subscribing liberally for a cotton factory.

—Aberdeen, Miss., has a boot and shoe factory in successful operation.

—The Wheeler and Wilson sewing machine manufactory at Bridgeport has made 319,550 machines.

—The co operative foundry in Troy was closed recently in consequence of the intense heat. The moulding shops will remain closed for a few days.

—There are two firms at Geneva engaged in the manufacture of musical birds, producing not more than one hundred a year.

—The Bath (Me.) *Times* says there will be at least ten ships on the stocks in that city within two months, and that there will be a greater demand for labor than there has been for the past two years.

—In Vineland, N. J., there is a constant and ever increasing desire for more manufacturing facilities. Within two years a great many different kinds have been begun there. A button factory is to be the next attempt, which will probably employ forty persons.

—One of the most thriving establishments in Chicago is a wagon factory, founded thirty years ago by a poor mechanic, whose entire capital at starting was just sufficient to enable him to complete one rough farmer's wagon. It gave satisfaction to the man that bought it, it brought in plenty of new orders to the maker, and the factory is now turning out from five to seven hundred wagons per month.

—A Troy, N. Y., firm are engaged in the manufacture of paper boats for various purposes, under a patent granted by the United States and the English Patent Office. The boats consist of a light wooden frame supporting a paper skin and deck, the thickness of the paper skin being suited to the object for which the boat is to be used. They have water and air-tight compartments at each end, giving them great buoyancy. The firm commenced with five hands a few months since, have now sixteen, and the demand for boats has rendered a large increase necessary. Their shop is 200 by 25, besides a large building for drying the varnishes used. A five horse power engine furnishes the power requisite for their machinery. They have built this season and are completing over thirty racing boats, which have been sent to various parts of the country, and they expect to be able to turn out an average of five per week.

—The people of Montana are devoting some attention to coal mining, an extensive deposit having been opened near Virginia City. The supply appears to be practically inexhaustible, and though of inferior quality, there is little doubt but that it will improve as a greater depth is attained, as is usually the case in coal formations.

—The Water Commissioners of Boston have adopted, as a sanitary and economical measure, the patent lead-encased block-tin pipe, manufactured by the Colwell, Shaw & Willard Manufacturing Company of N. Y. Other corporate cities, watchful of the health of the people, should follow this example.

Advertising Index.

☞ In looking for advertisements, see figures 1 to 9, within brackets, at head of advertisement pages.

GAS-BURNERS, APPARATUS, ETC.

Arnold's Metallic Gas Trays—T. G. Arnold, 334 and 336 West 21st street, N. Y. [2]
American Meter Company, 512 West 22d street, New York [8]
Automatic Gas Purifier—State Rights for sale—Wm. C. Turnbull, care of T. C. Babcock, 59 Broadway, or office of the American Gas-Light Journal [2]
Builder of Gas Works, Apparatus, Etc.—P. P. Deily, 39 Laurel street, Philadelphia [2]
Contractors for Gas-works, Etc.—Murray, Baker & Walker, Fort Wayne, Ind [2]
Cambridge Gas Stoves, Ranges, &c.—Gas Light Journal Offices, [3]
Gas Coals—Bird, Perkins & Job, 104 Wall street, New York [4]
Gas Engineers and Contractors—Hoy, Kennedy & Co., 111 Liberty street, New York [4]
Gas-Burners—C. Gefrorer, 529 Commerce street, Philadelphia, Pa [9]
Gas Meter Manufacturers—Harris & Bro., 1117 Cherry street, Philadelphia, Pa [8]
Gas Superintendent—C. M. Cresson, 417 Walnut st., Phil., Pa. [9]
Gas Apparatus, &c.—Geo. H. Kitchen & Co, 561 Broadway [9]
Gas Burners—Wightman Bros., 25 Kilby st., Boston, Mass. [9]
Gas Burners—T. G. Arnold, 224 and 226 West 21st st., N. Y. [2]
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Gas Works for Sale—Colonel J. A. Sabbaton, Manhattan Gas Works, N. Y. [8]
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Gas Fixtures, Meters, Etc., Etc.,—McHenry & Carson, Cincinnati, Ohio [4]
Gas Fixtures & Chandeliers—Alfred Bliss & Co., 95 Bleecker-st., New York [2]
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Patent Gas Exhauster—Smith & Sayre, 484 Broadway [5]
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FOUNDRIES.

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Cast Iron Pipes and Fittings—B S. Benson, 52 East Monument street, Baltimore, Md [1]
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Water Closets, etc.—Wm. S. Carr & Co. 149, 151, 153, 155, 157 Centre street, New York [4]
Water and Sewerage Pipes—Am. Water and Gas Pipe Company northwest corner of Green and Bay sts., Jersey City, N. J. [5]
Worthington's Water Meters—H. R. Worthington, 61 Beekman street, New York [2]
Woodward Steam Pump Mf'g Co. 76, 78 Centre st. New York [9]

CLAY RETORT WORKS.

Bay State Clay Retort Works, 125, 127 Water st. Boston, Mass. [6]
Brooklyn Clay Retort Works, Van Dyke st. Brooklyn, N. Y. [5]
Clay Retorts, Tiles, etc.—J. H. Gautier & Co. Jersey City, N. J. [5]
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Mannattan Clay Retort Works, 15th st. near Av. C, New York [5]
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Philadelphia Fire Brick Works, Vine and 23d sts. Philadelphia. [5]
Retorts, Pipes, &c.—R. D. Wood & Co., 400 Chestnut street, Philadelphia [9]

MINING MACHINERY, ETC.

Broker in Mining Stocks—C. H. Smith 5½ Pine st. New York [4]
Industrial Chemistry—Prof. H. Dussauce, New Lebanon, N. Y. [2]
Mining Engineer—J. H. Tiemann, 240 Pearl st. New York [4]
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School of Mines, Columbia College, East 49th st. " [2]
J. S. Phillips, Mining Engineer, Wadsworth House, San Francisco, Cal [8]

LAMPS, STOVES, PETROLEUM, ETC.

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MISCELLANEOUS.

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Fire Extinguisher—U. S. Fire Extinguisher Co., 8 Dey street. [9]
Finkle & Lyon Sewing Machine Company, 581 Broadway [9]
Gas-Light Journal American and Foreign Patent Agency [1]
Opposition S. S. Line to California—177 West st., cor. Warren [9]
Prince's Metallic Paint—D. Sloan & Co. 115 Liberty street [5]
Plastic Slate Roofing Co. 157 Broadway [7]
Pianos—Raven & Bacon, 644 and 646 Broadway, N. Y. [9]
Prospectus of the Literary Journal of Science and Art [1]
Partner Wanted—Wm. Bent, Medina, Orange County, N. Y. [1]
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Situation as Manager Wanted—G. B. Dunne, 46 Amity-st N Y. [1]
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Ventilation—Henry A. Gouge, 254 Broadway [6]
Watches—T. B. Bynner 189 Broadway [2]
Works on the Manufacture of Gas—D. Van Nostrand, 192 Broadway, New York [2]

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Brussels, Belgium—Henri Berge.

☞ All communications to be addressed to "The Editors," No. 22 Pine Street, New York.

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